

GRB studies with ASTROSAT

Much of what is known today about GRBs have resulted from multiwavelength observations

ASTROSAT is a multiwavelength observing platform

What is the potential of GRB studies with ASTROSAT?

ASTROSAT as a GRB instrument

as compared to SWIFT

Hard X-ray capability through CZTI : burst light curves

- *detector sensitivity ~25% at 200-400 keV*
- *increased FOV above ~200 keV*
- *cannot determine position*

SWIFT BAT: much larger, more sensitive, better imaging

SXT can detect X-ray afterglows, if pointed

- *up to a day possible*

SWIFT XRT: more sensitive due to narrower PSF

UVIT provides important UV-optical coverage

- *simultaneous multi-band*
- *grism*
- *extend UV afterglow follow-up to ~ 1 day*

SWIFT UVOT: less sensitive, smaller band, less capable

ASTROSAT will not have fast communication and slew capability

GRBs now: a brief overview

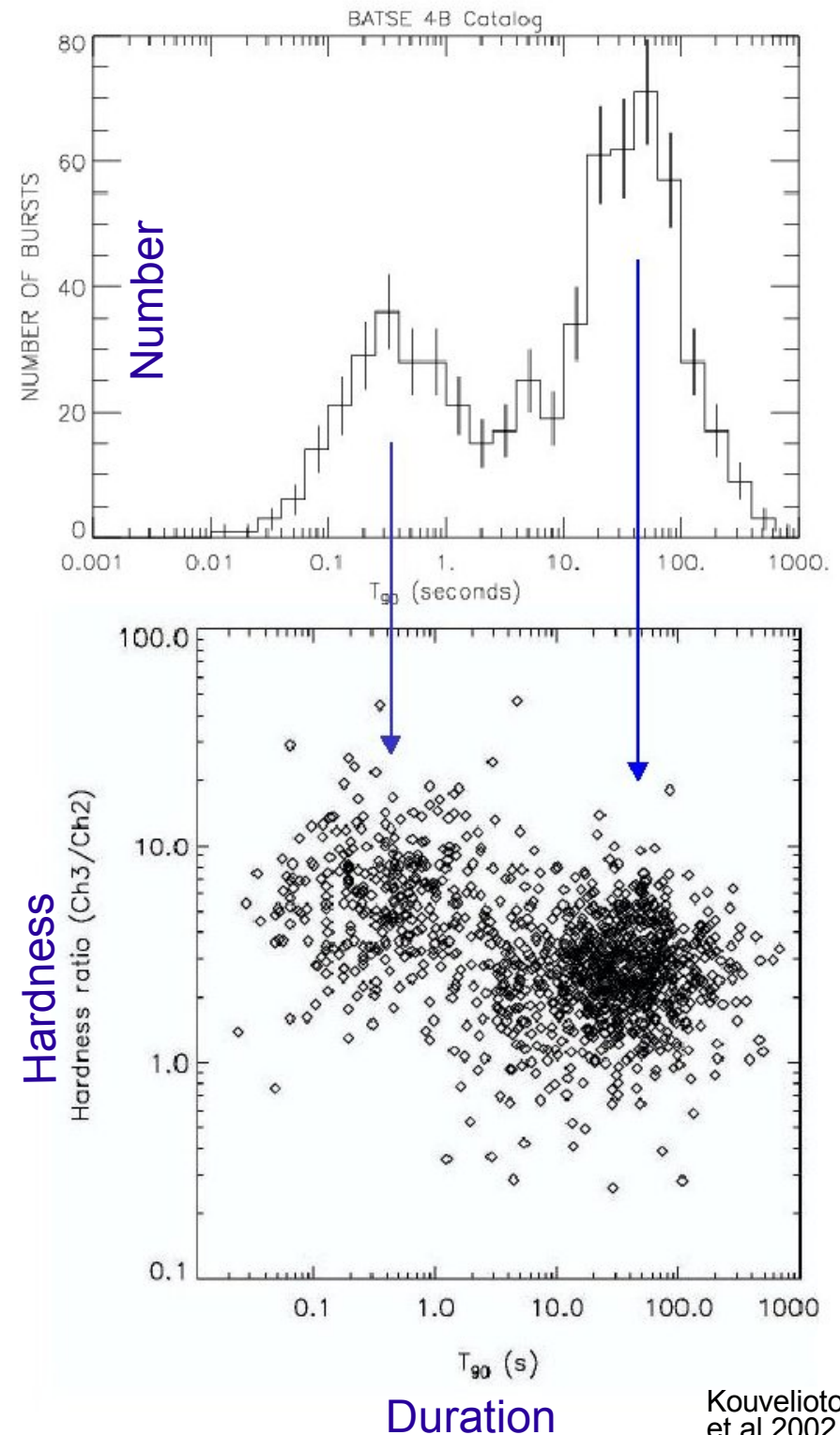
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- Long GRBs – associated with gas-rich galaxies, star forming regions

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- Short GRBs – in ellipticals ? SGRs ?

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- ISM / dust in host galaxies – extinction models, metal content, absorption spectra



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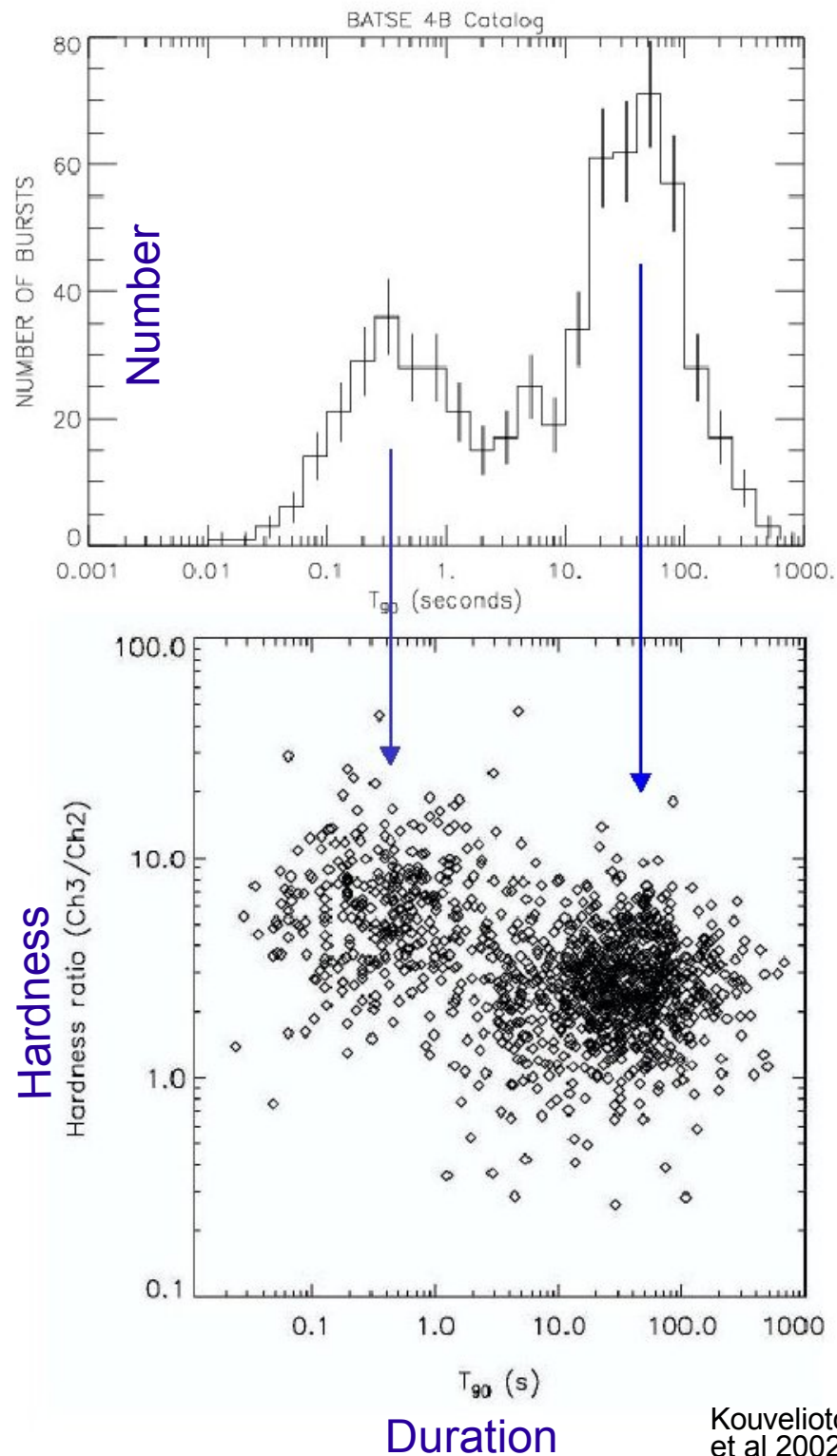
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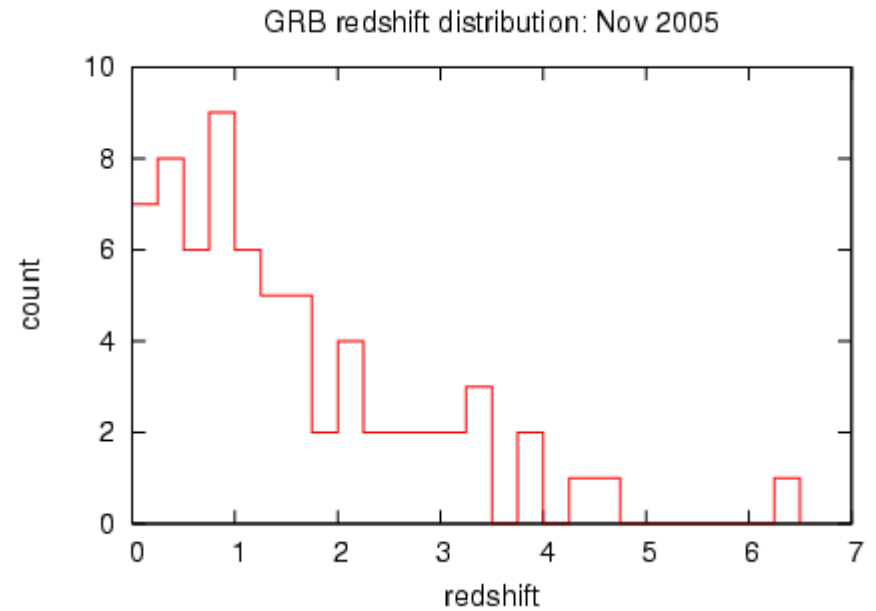
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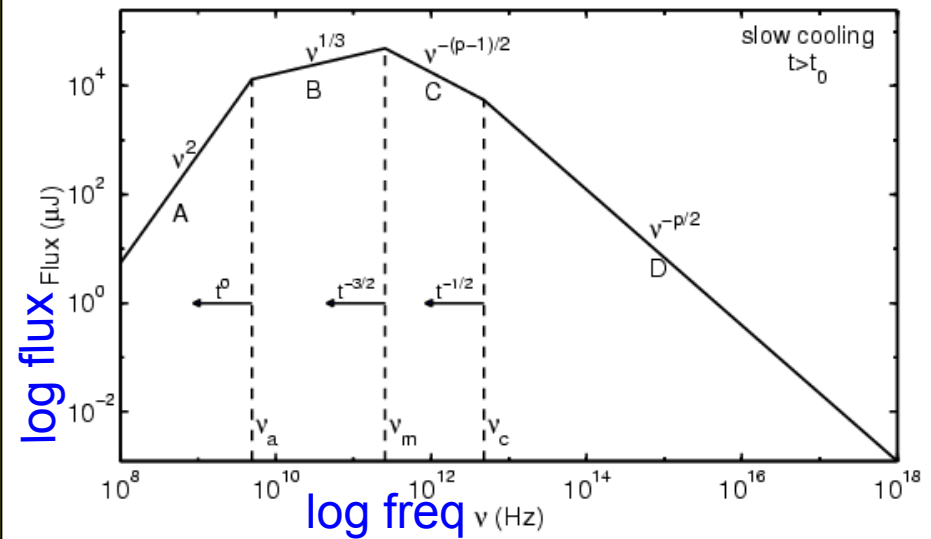
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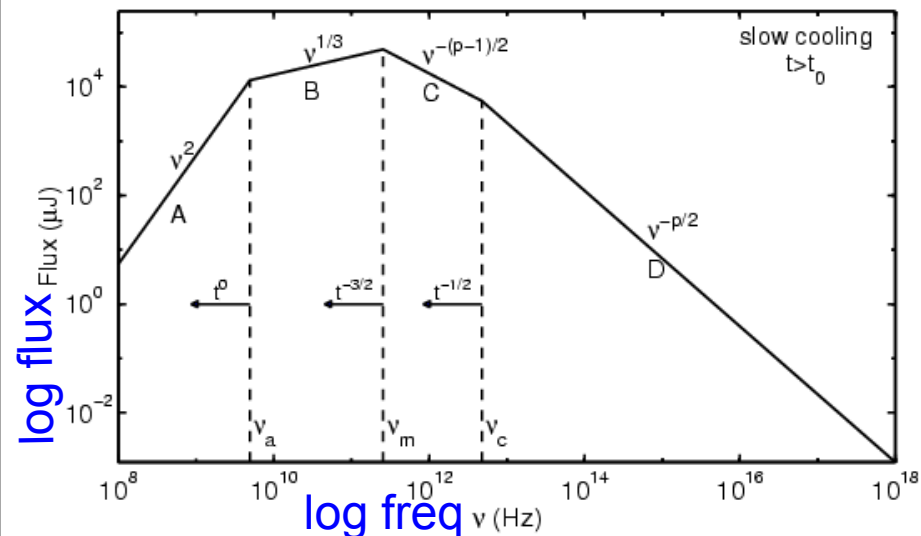
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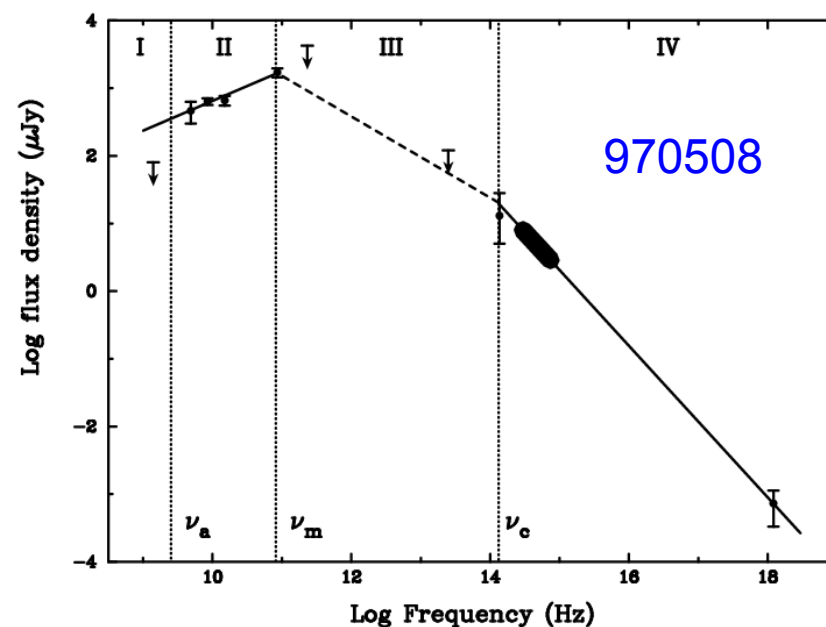
Sari, Piran & Narayan 98

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Wijers & Galama 1998

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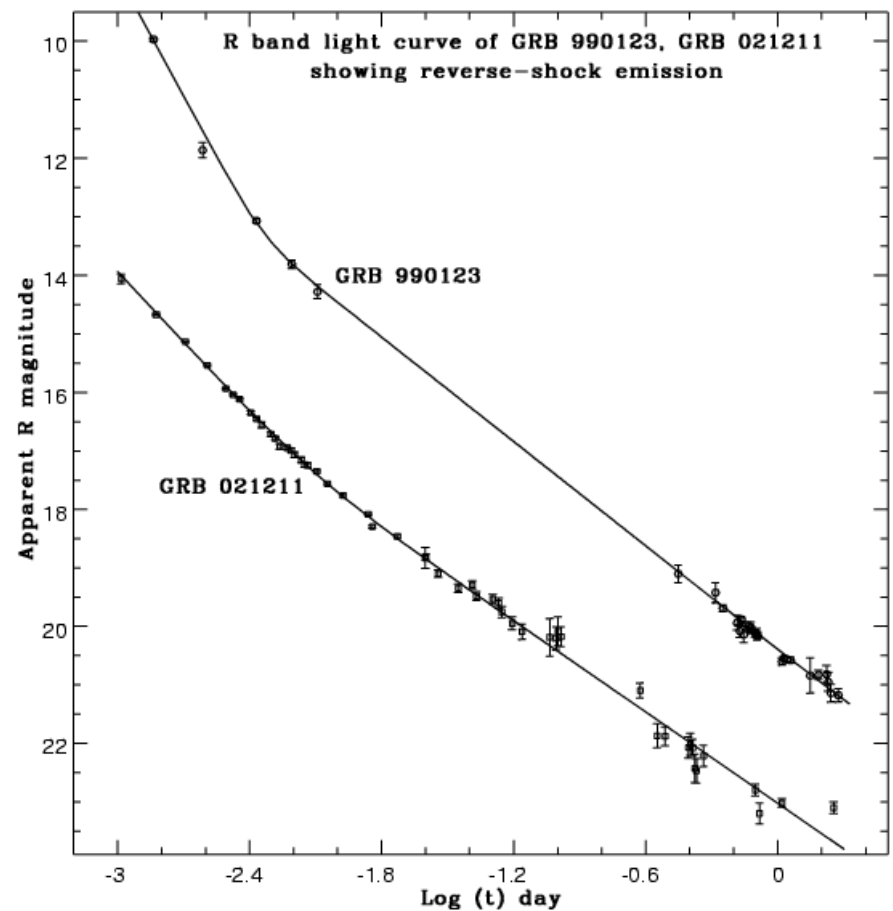
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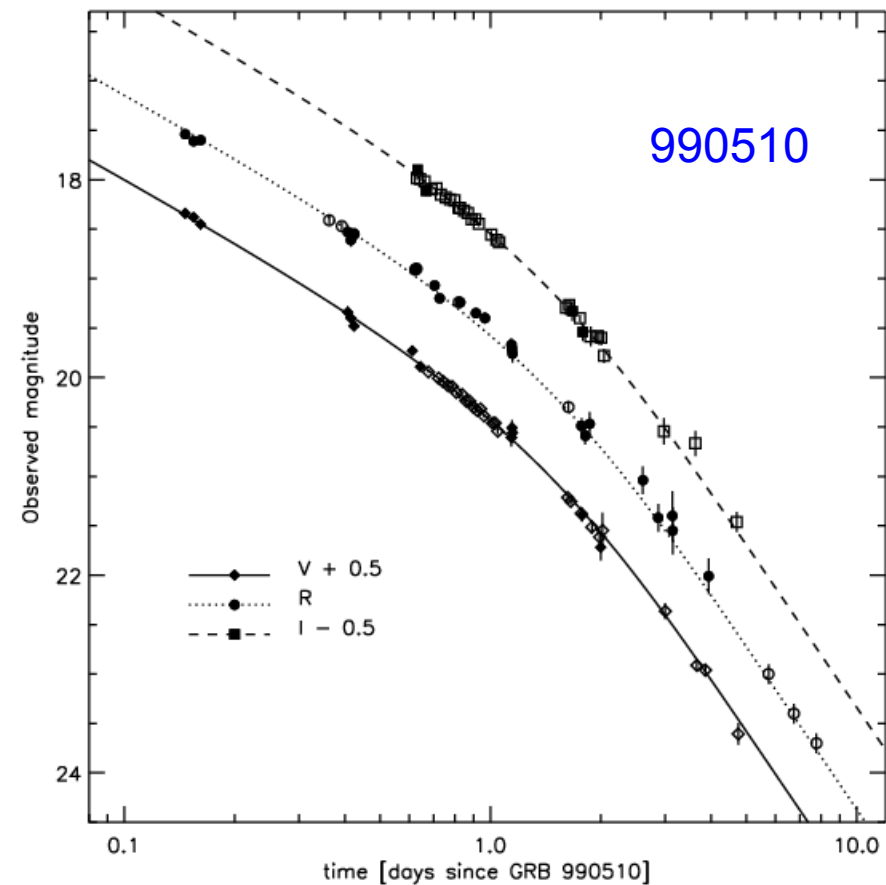
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Pandey et al 2003

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Harrison et al 1999

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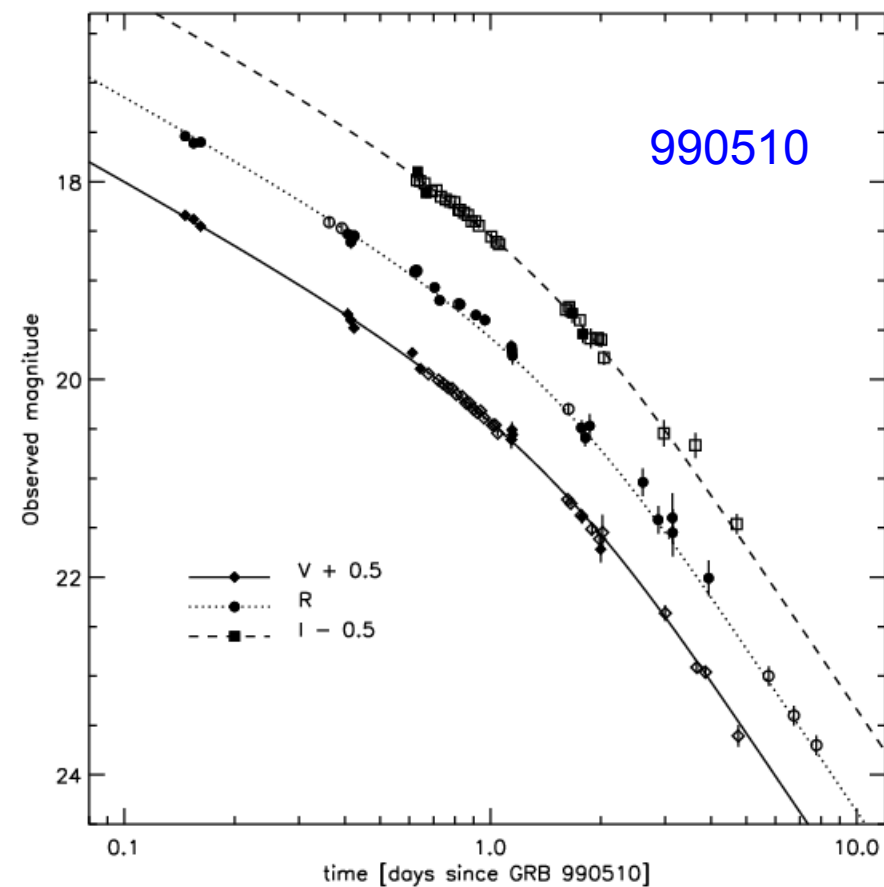
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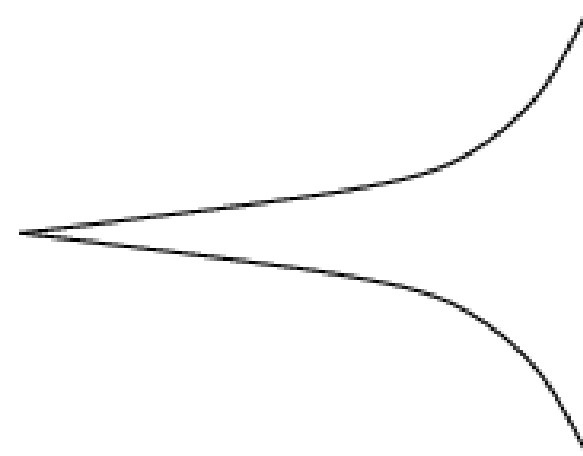
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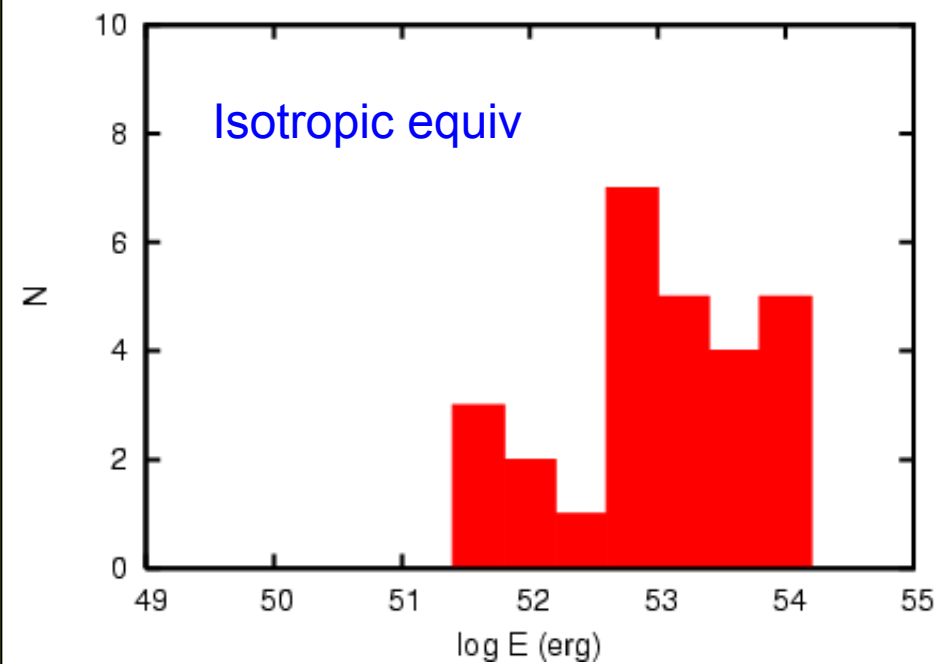


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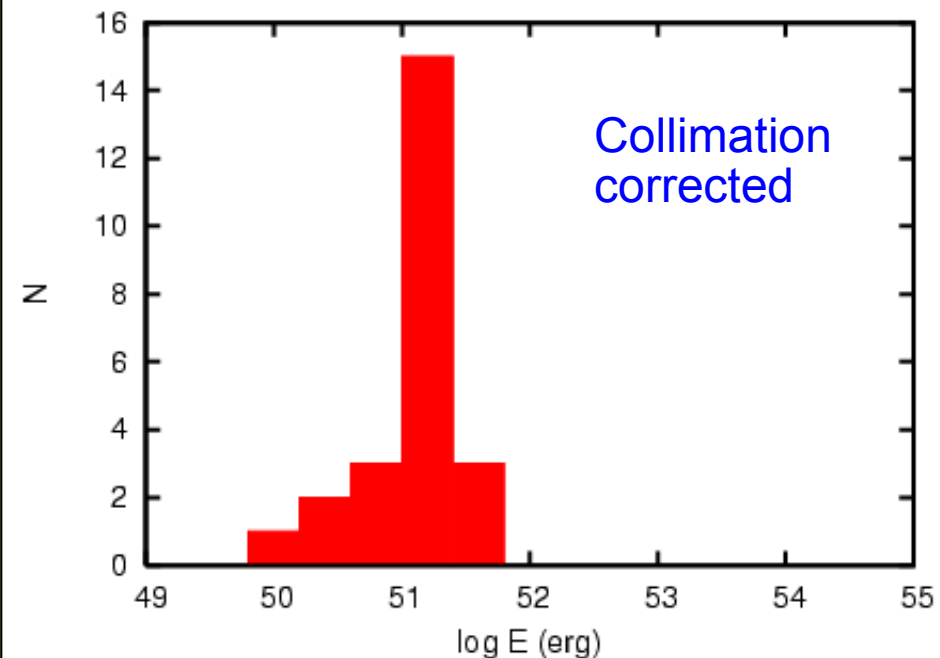
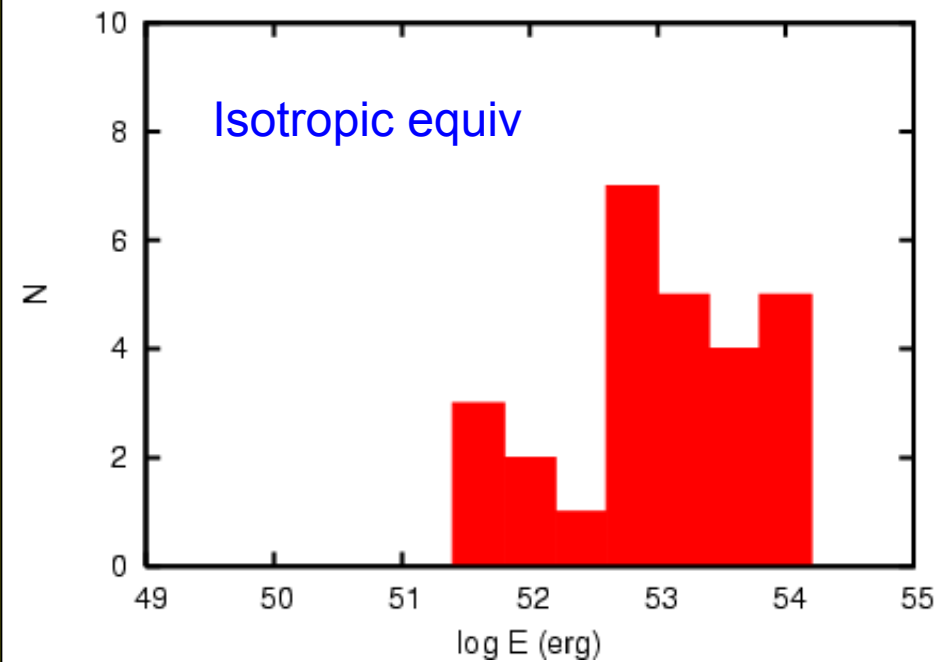
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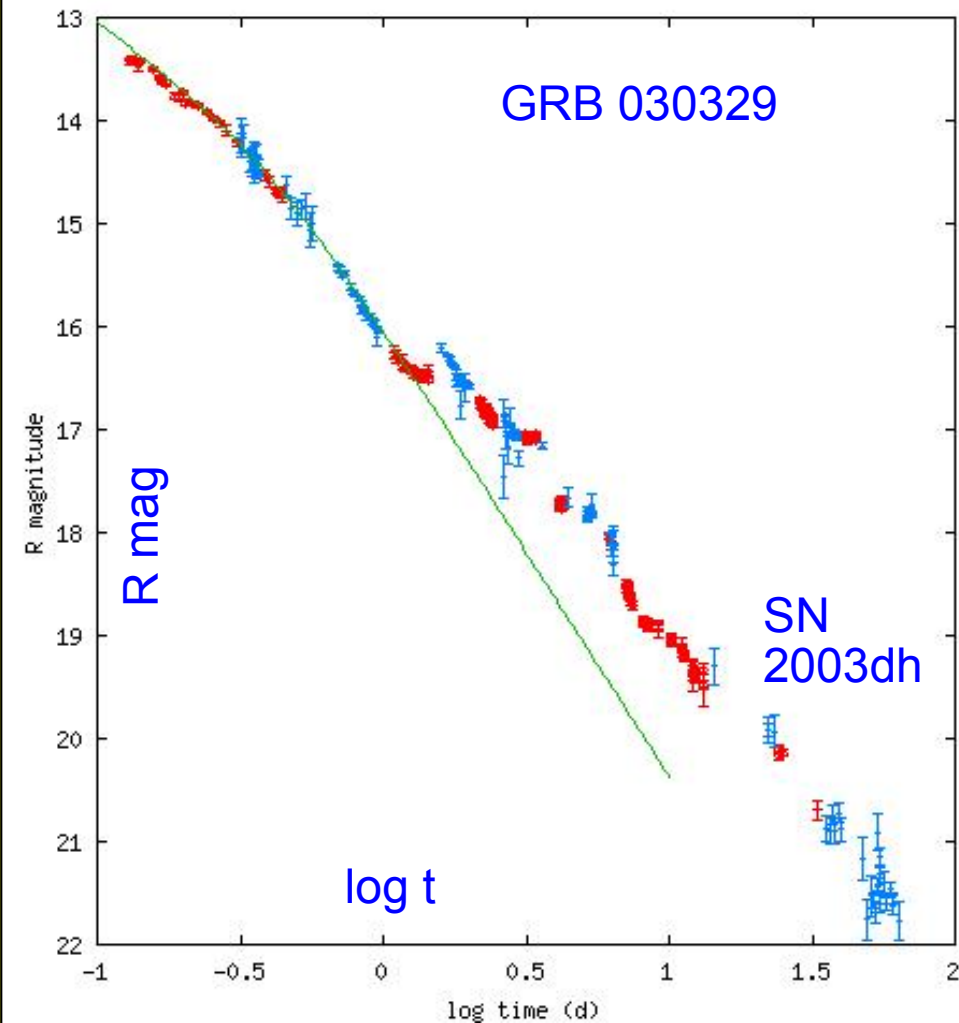
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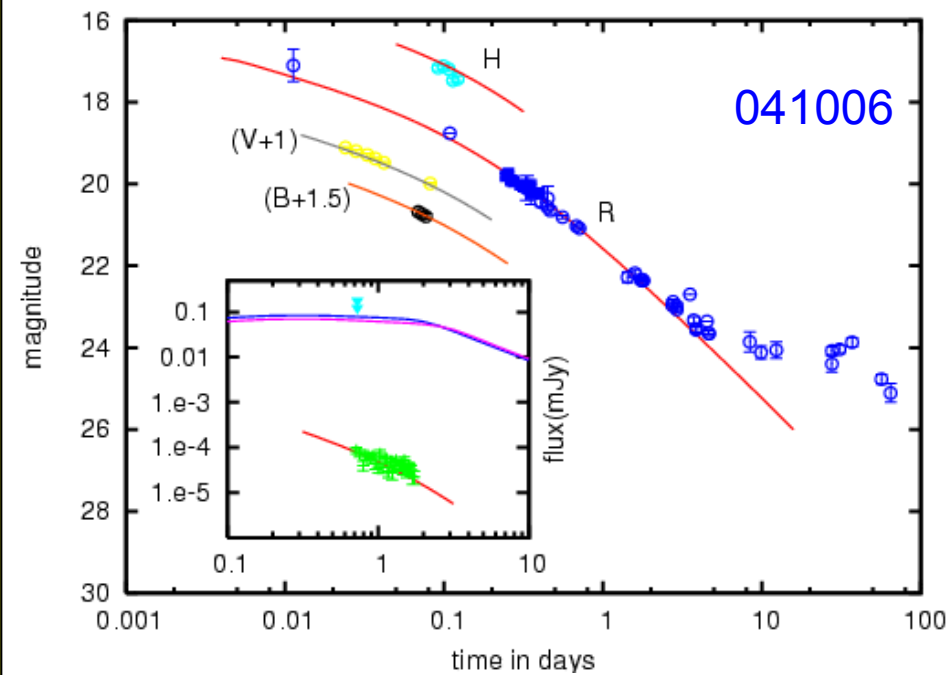
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Resmi et al 2005

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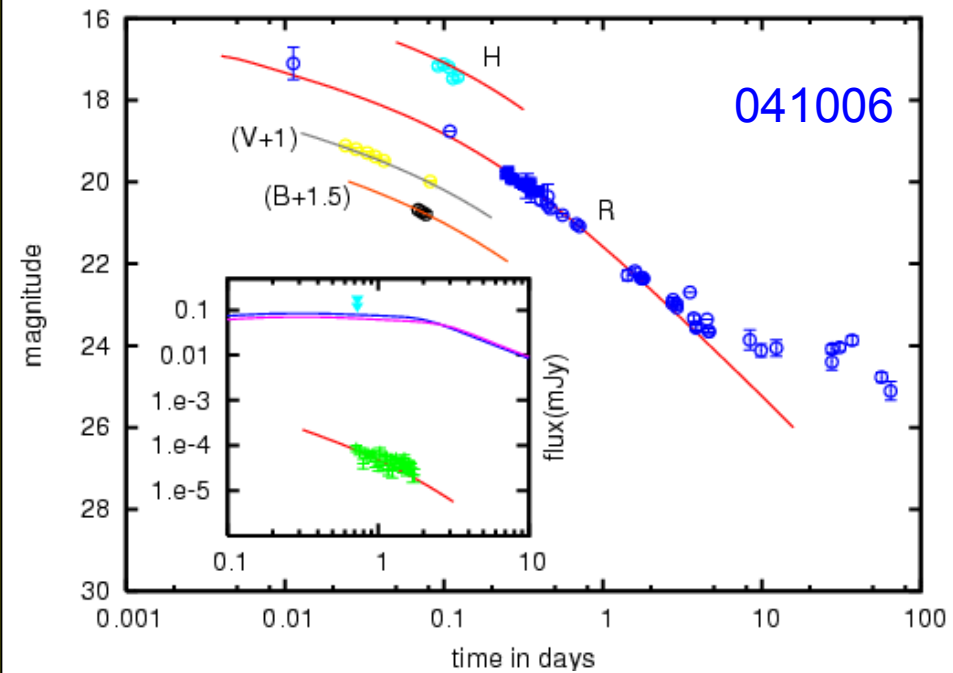
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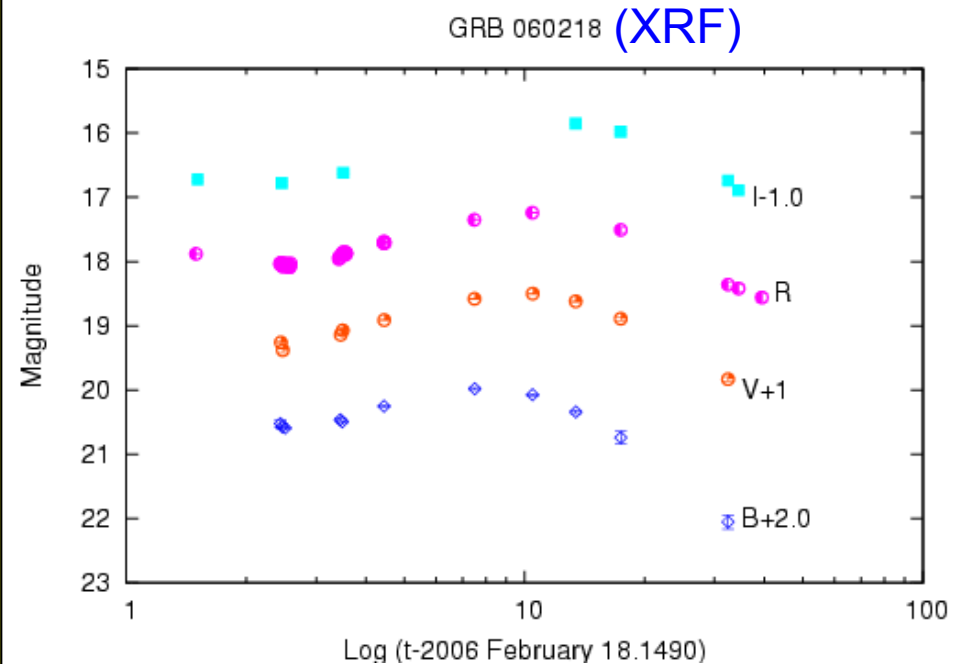
Misra et al 2005

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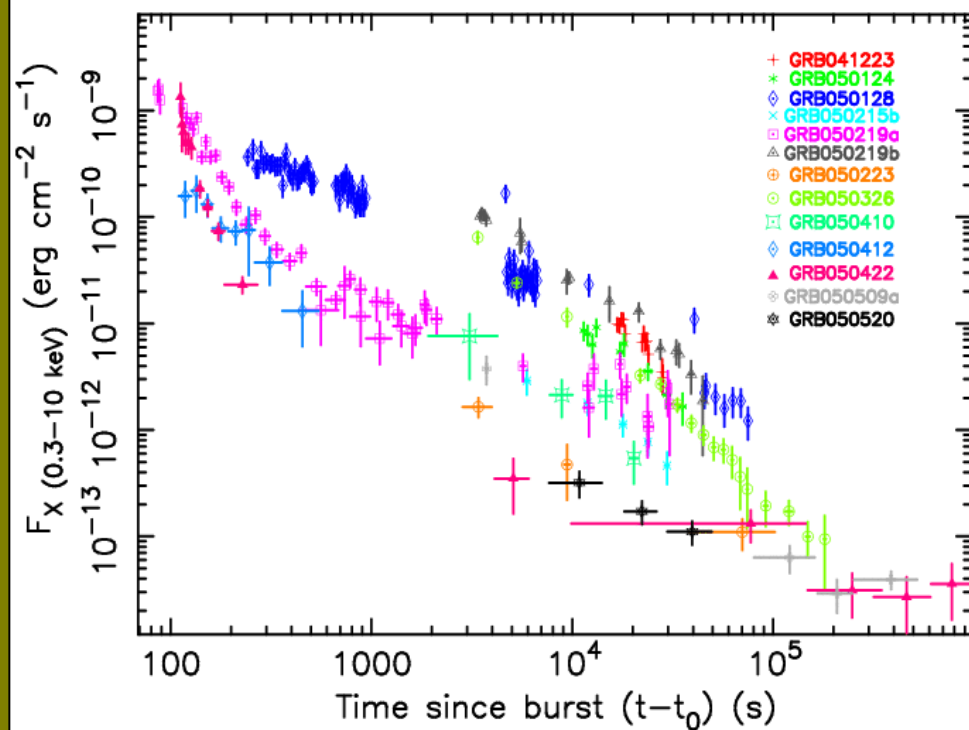
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Nousek et al 2005

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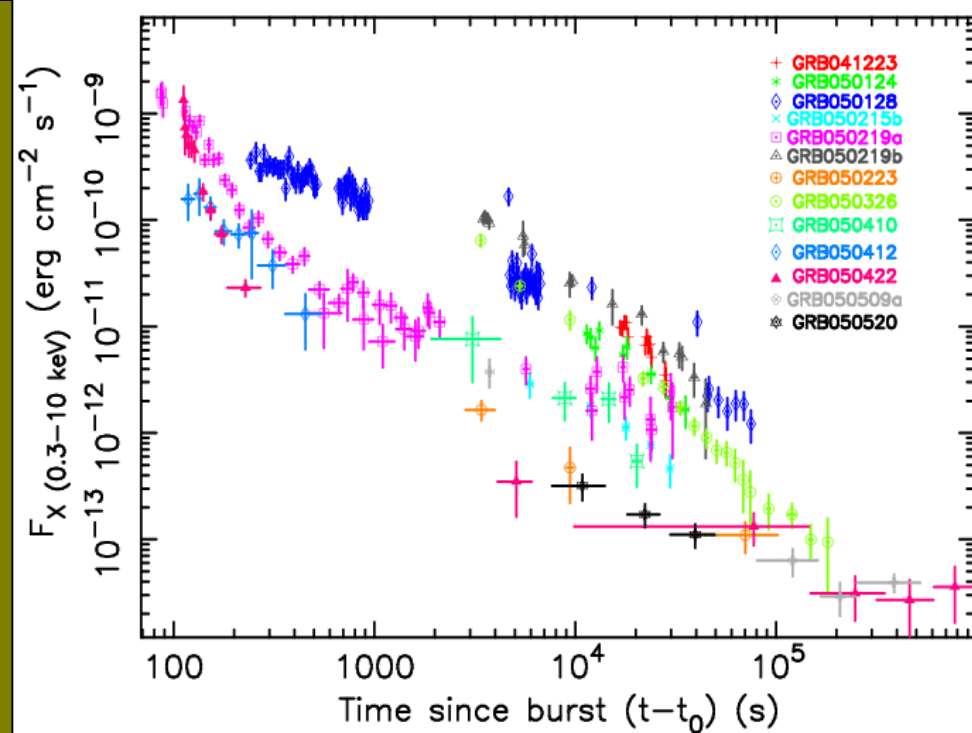
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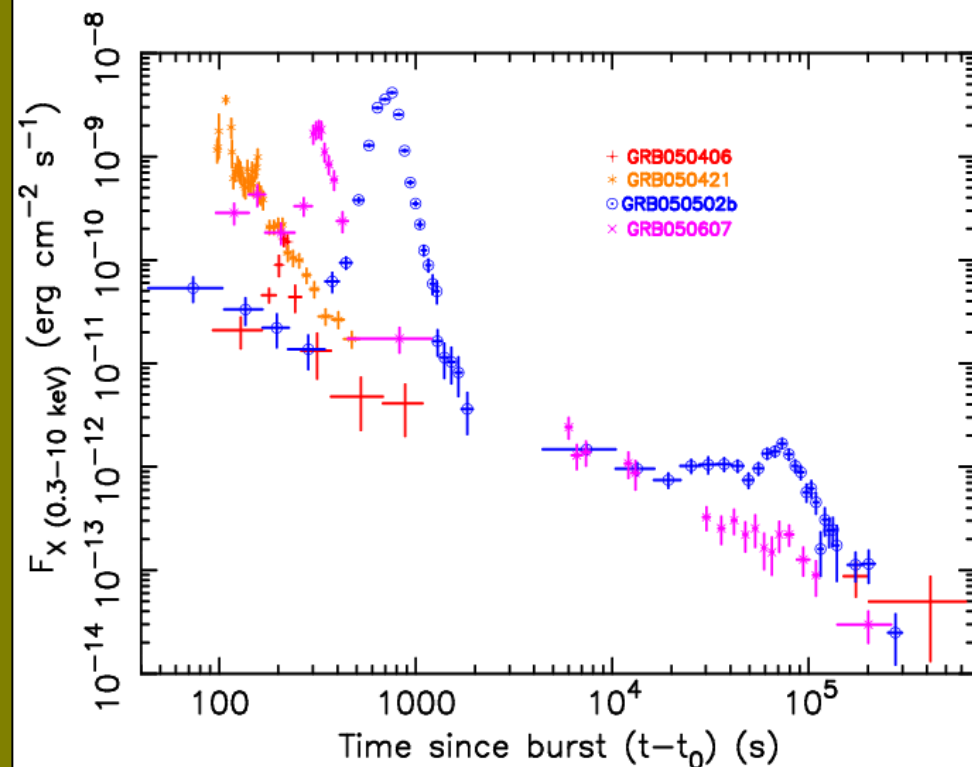
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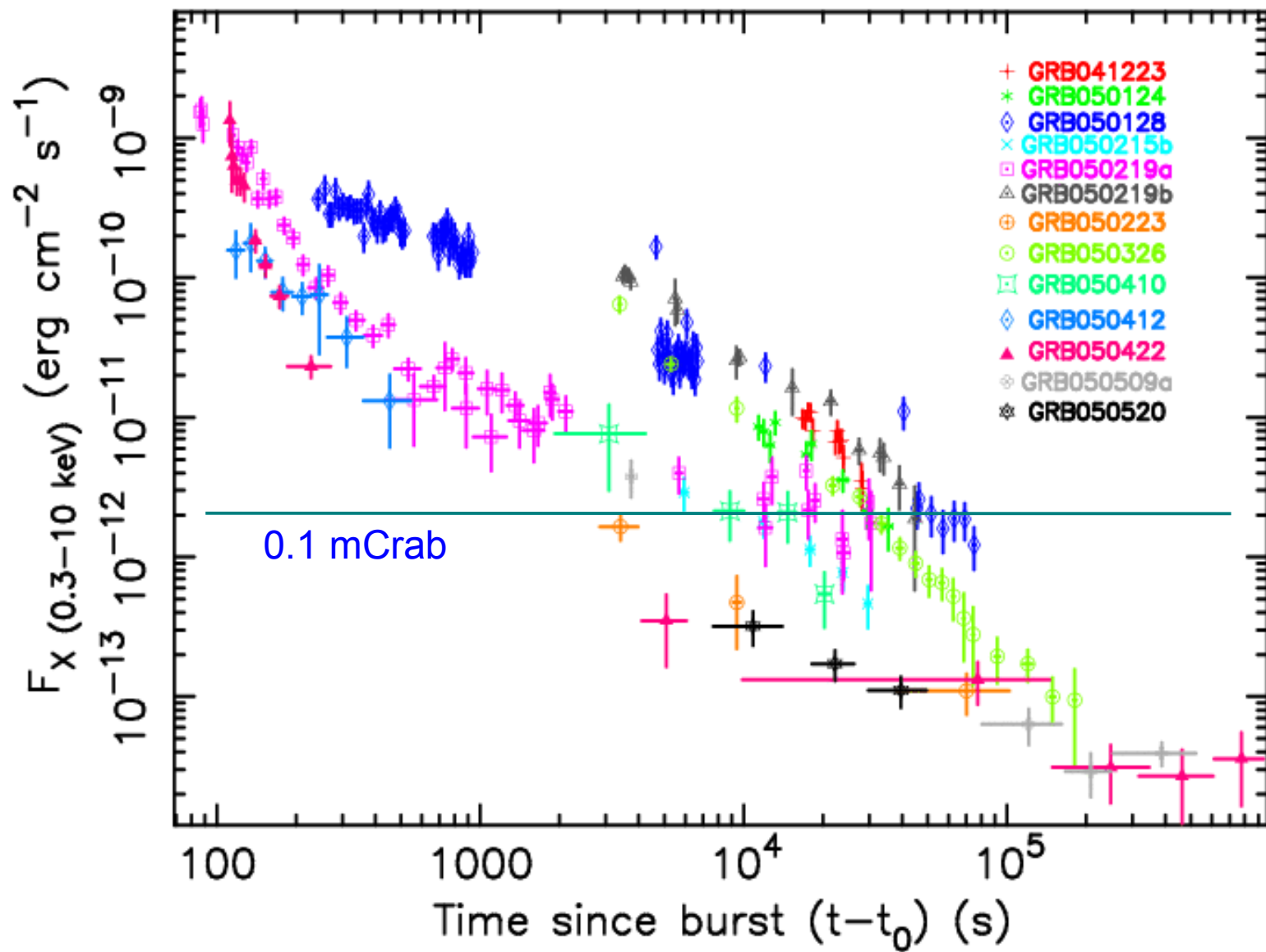
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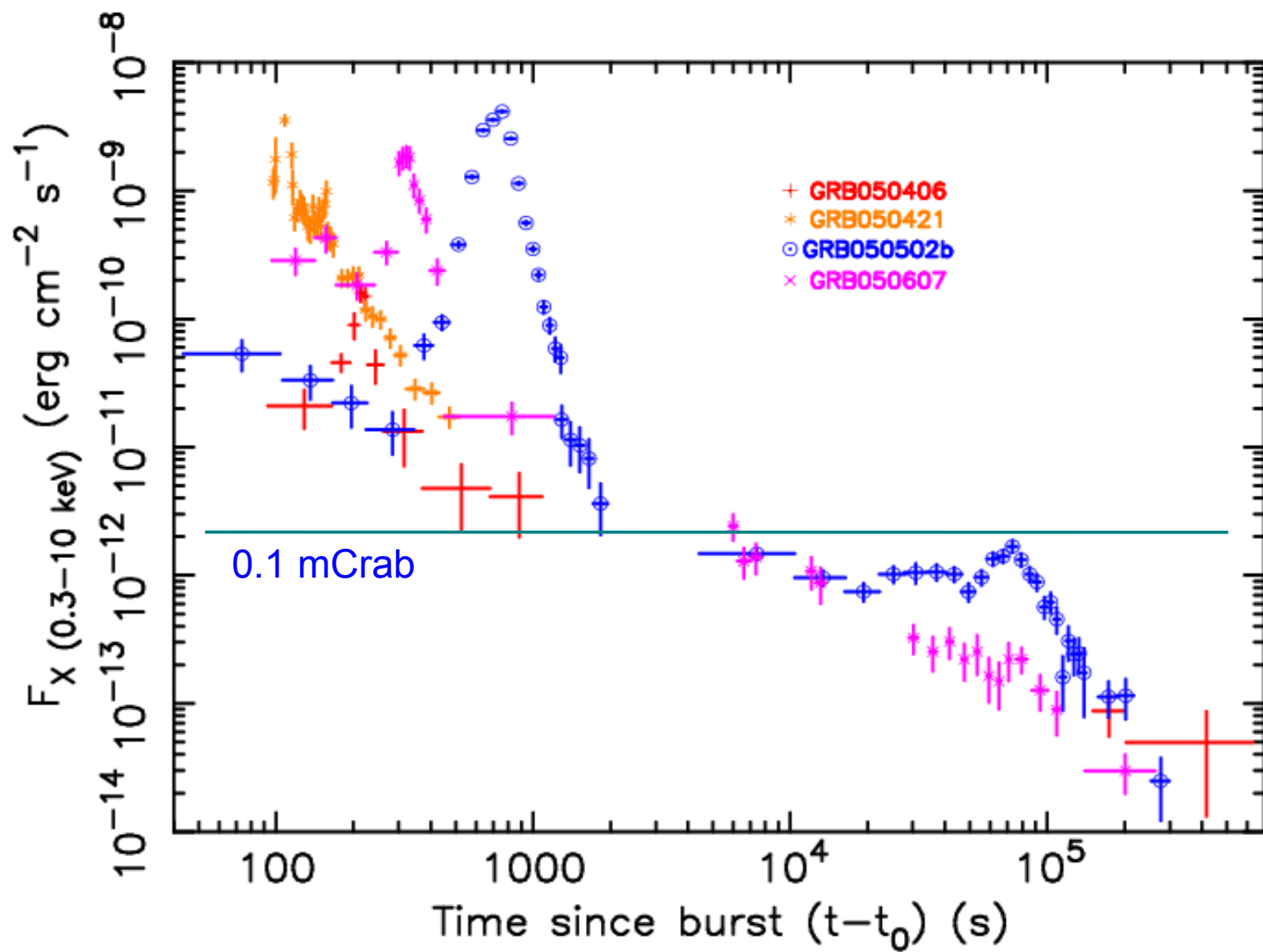
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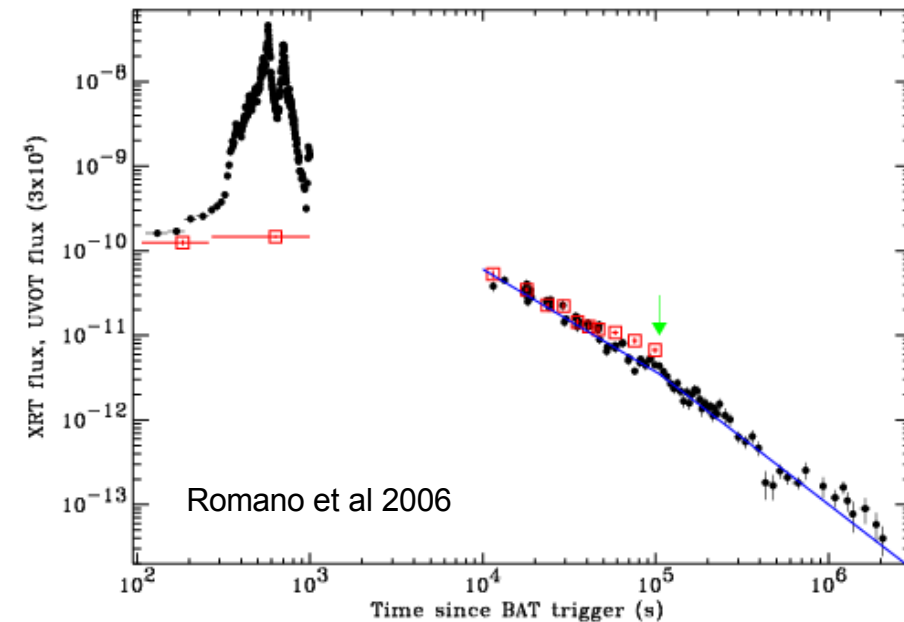
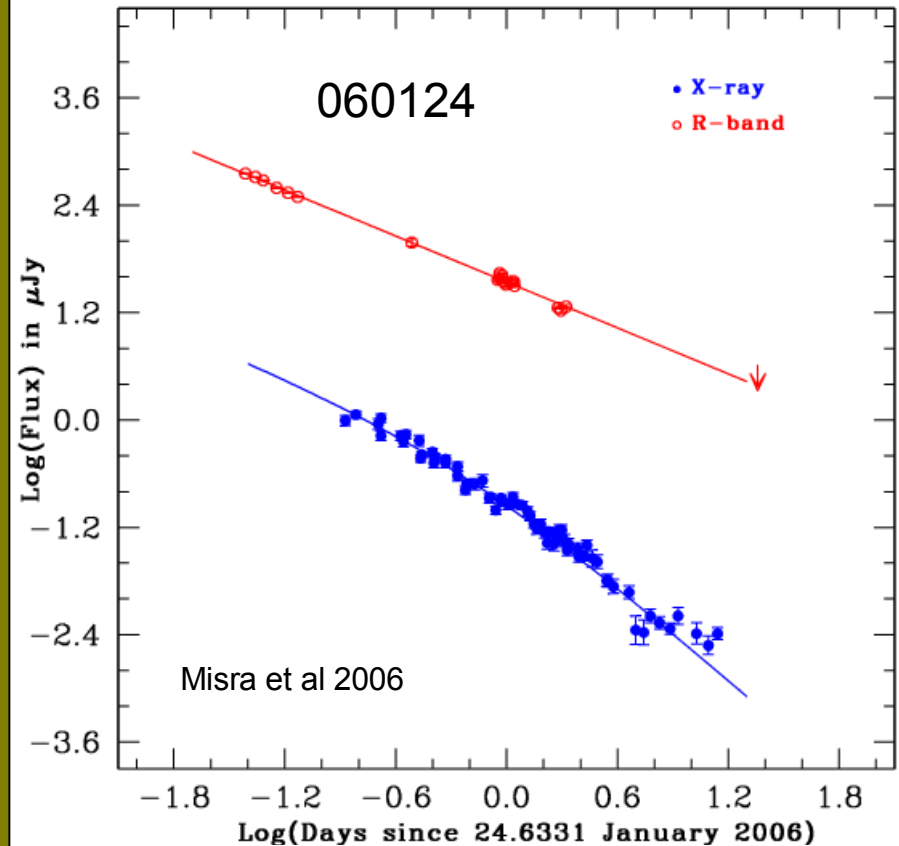
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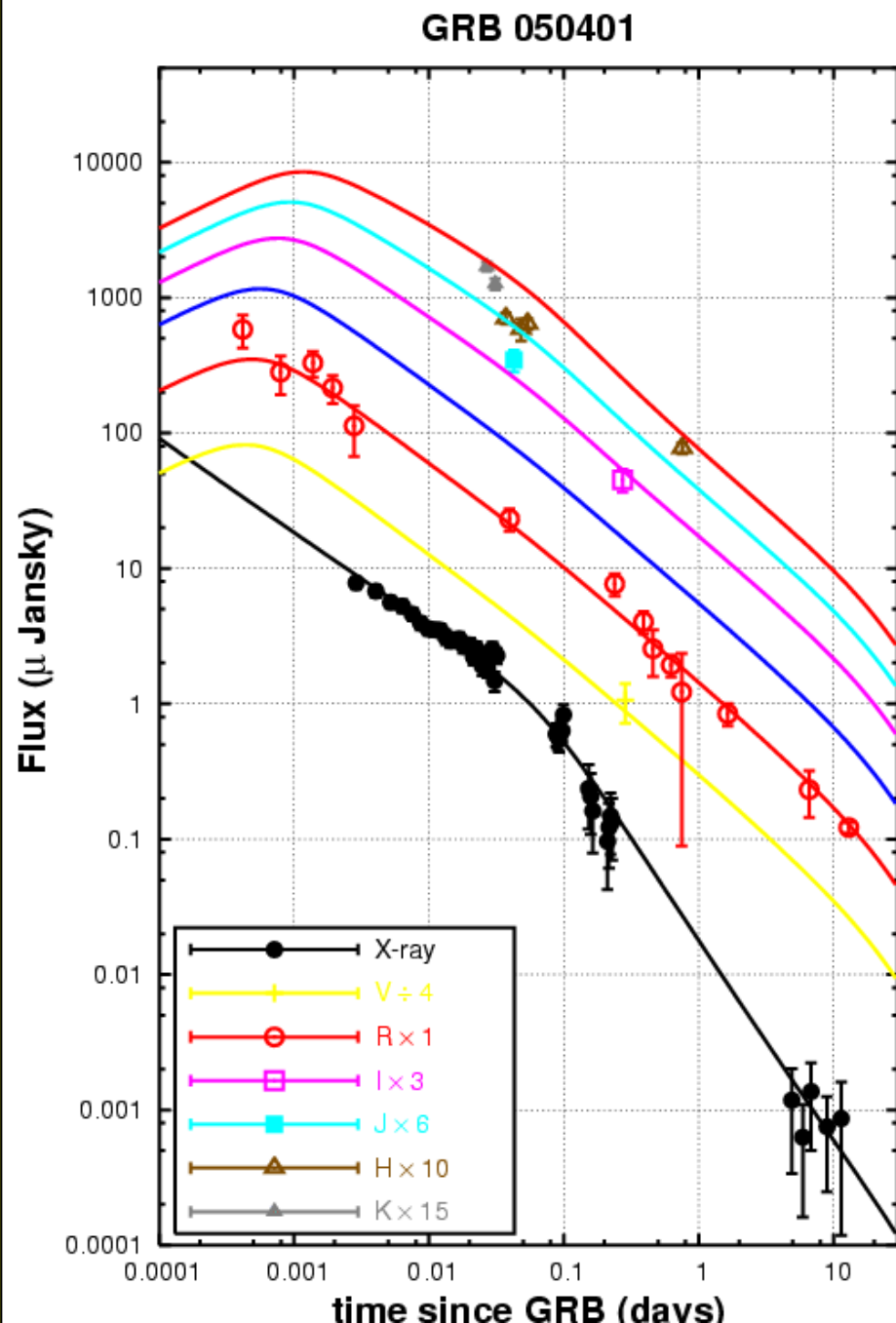
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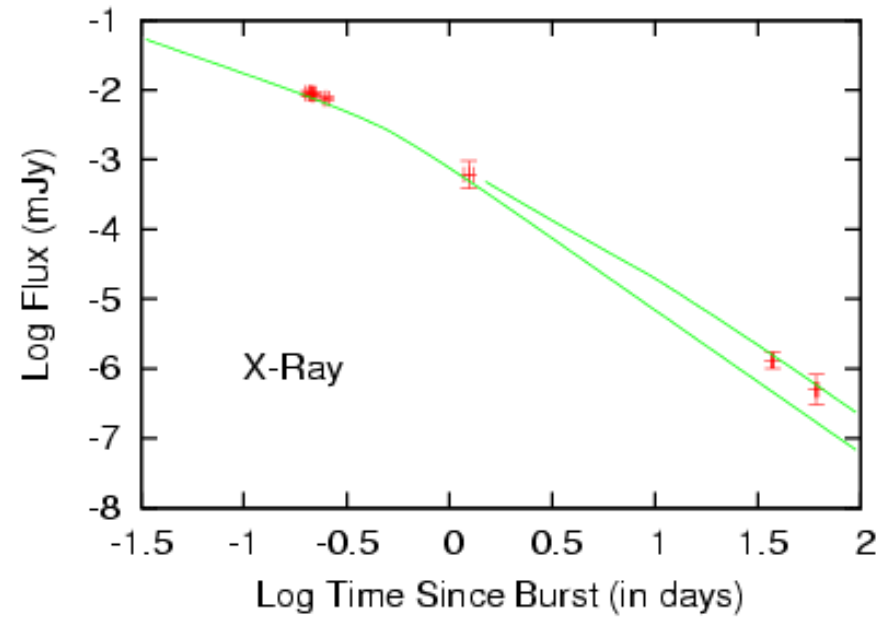
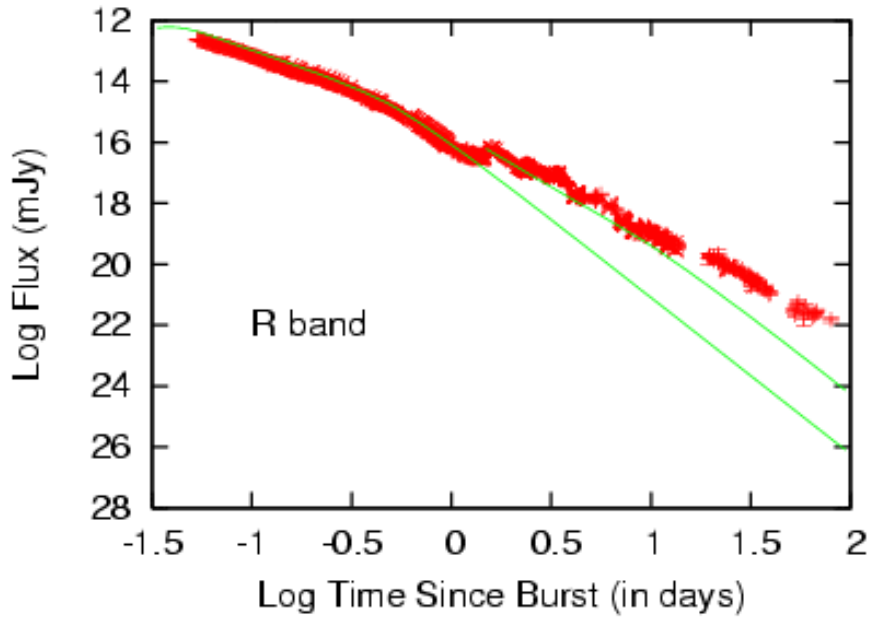
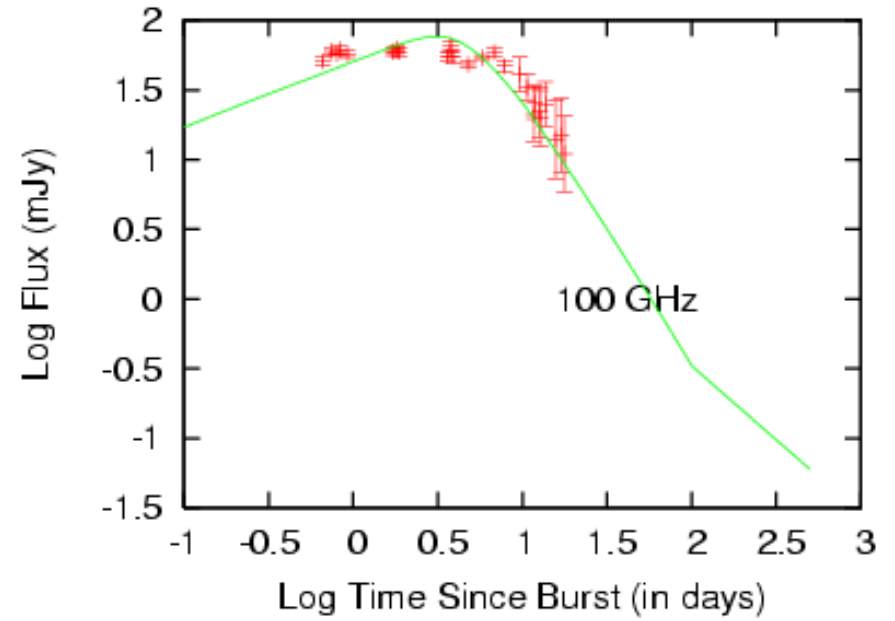
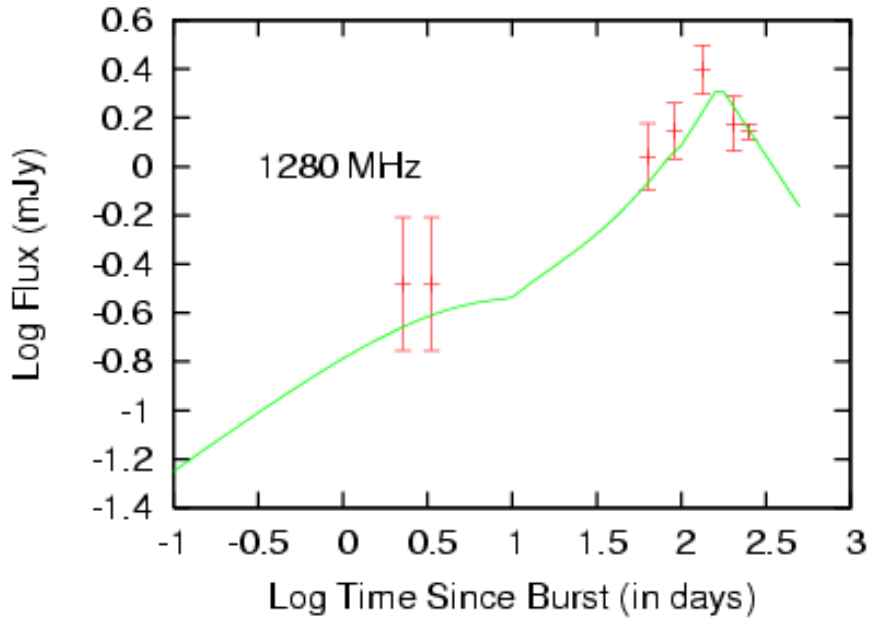
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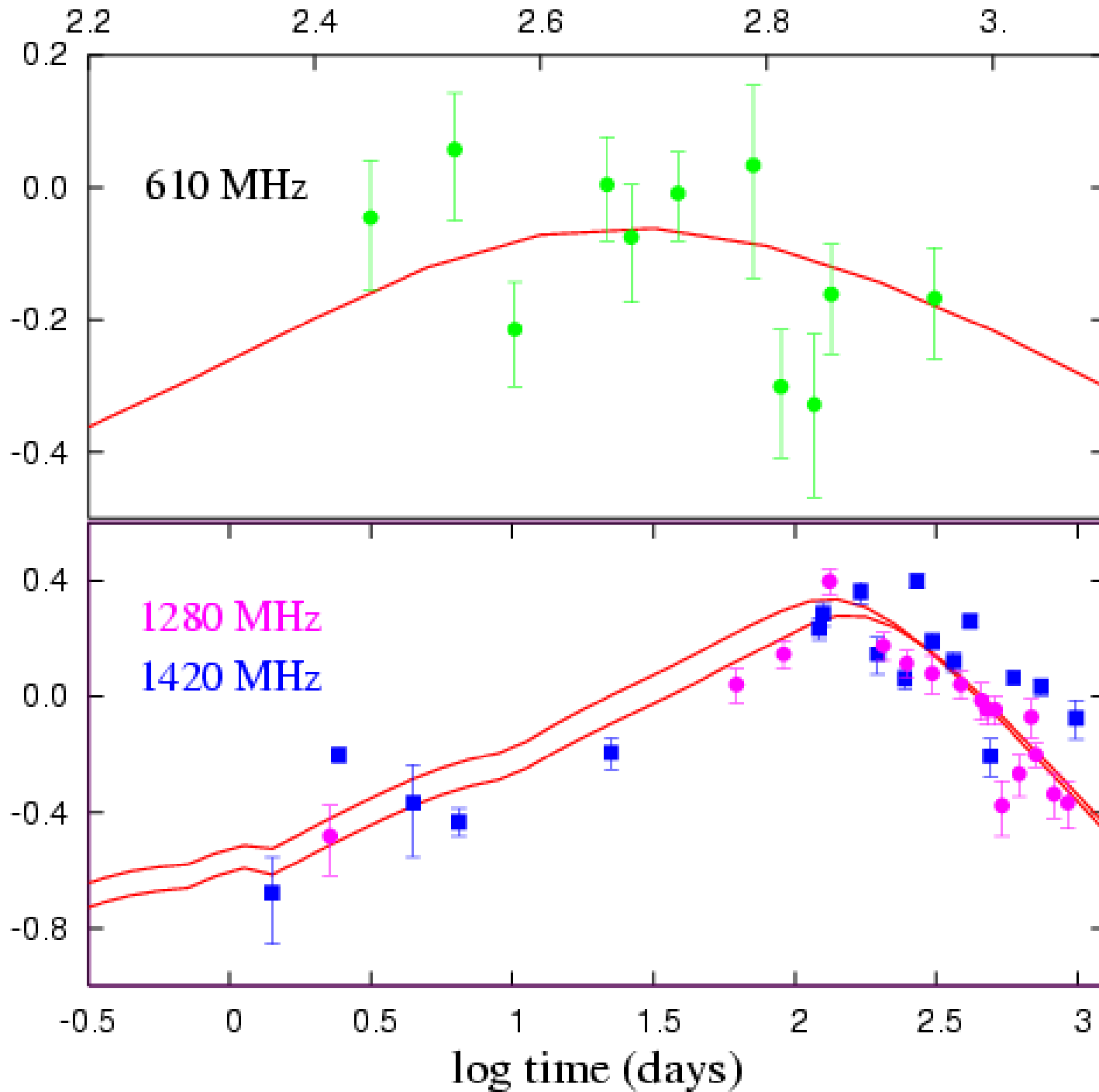
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GRB 030329





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C.H. Ishwara Chandra
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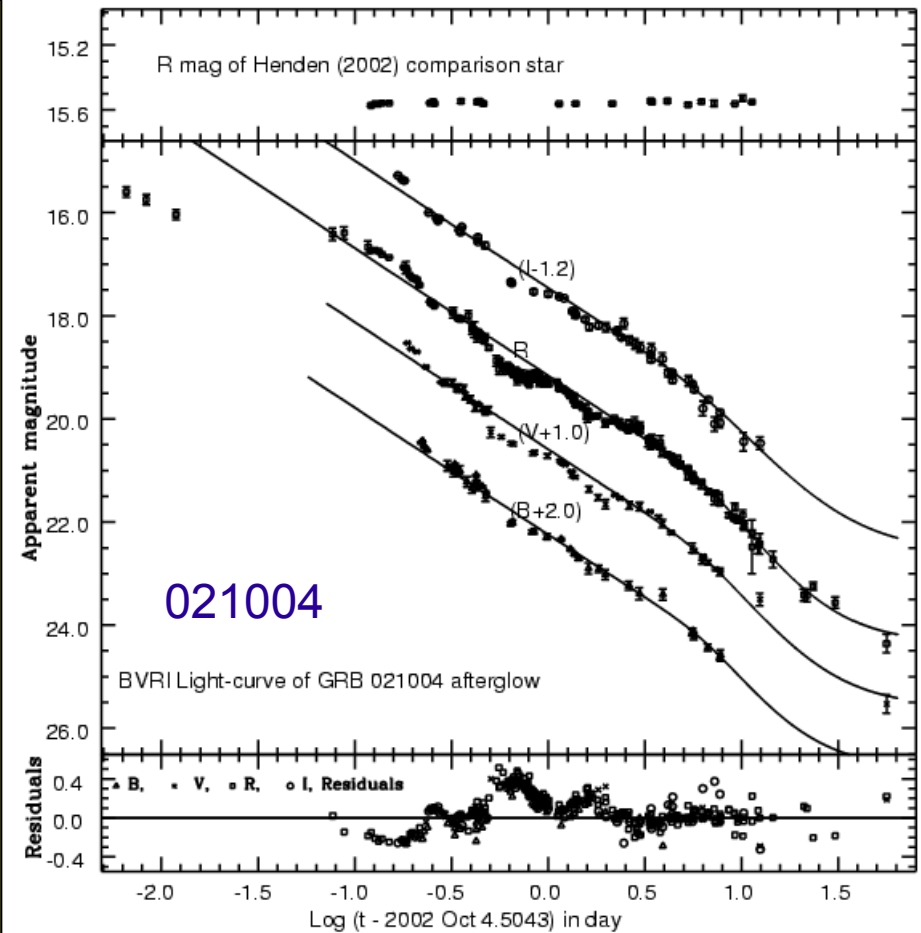
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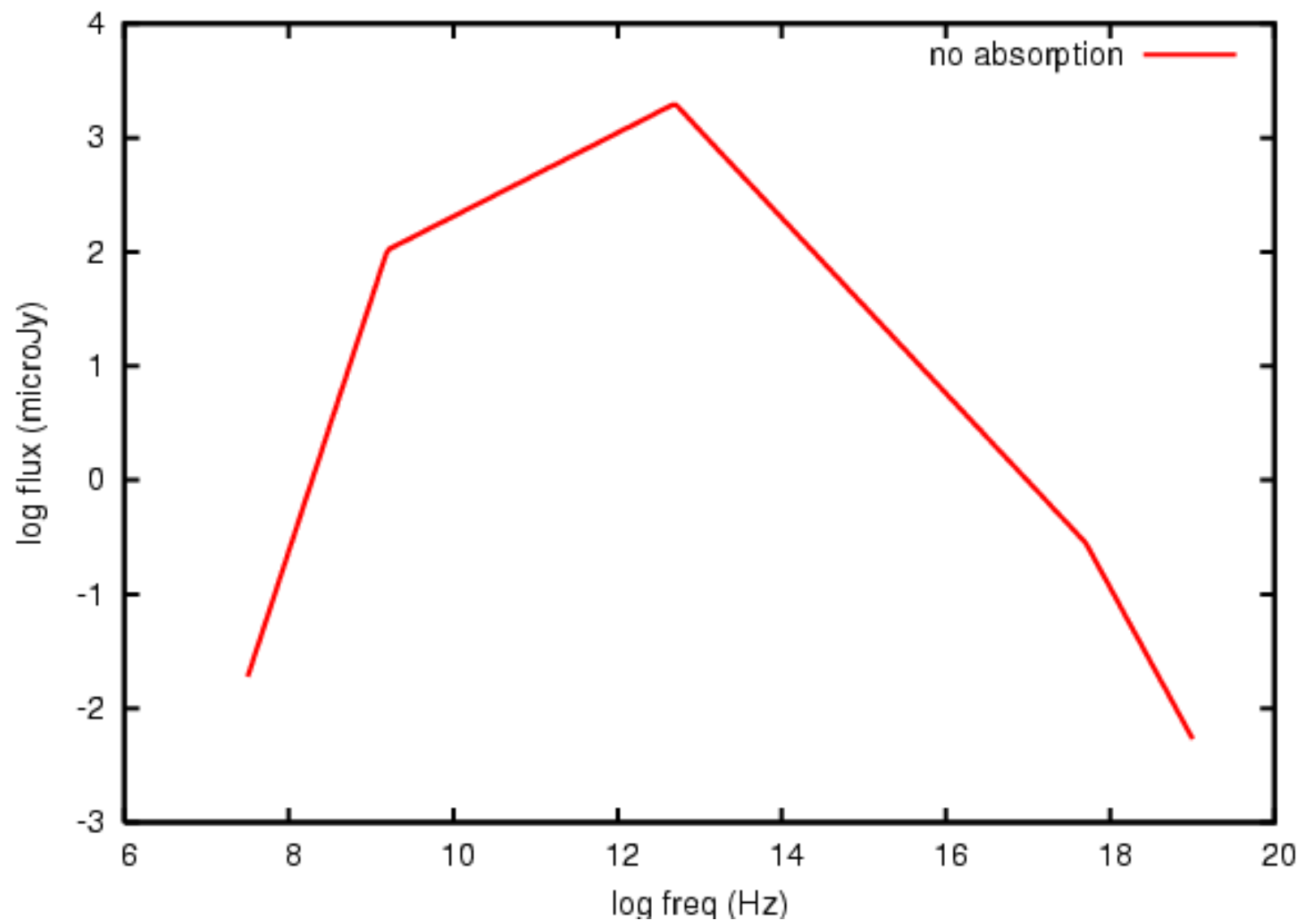
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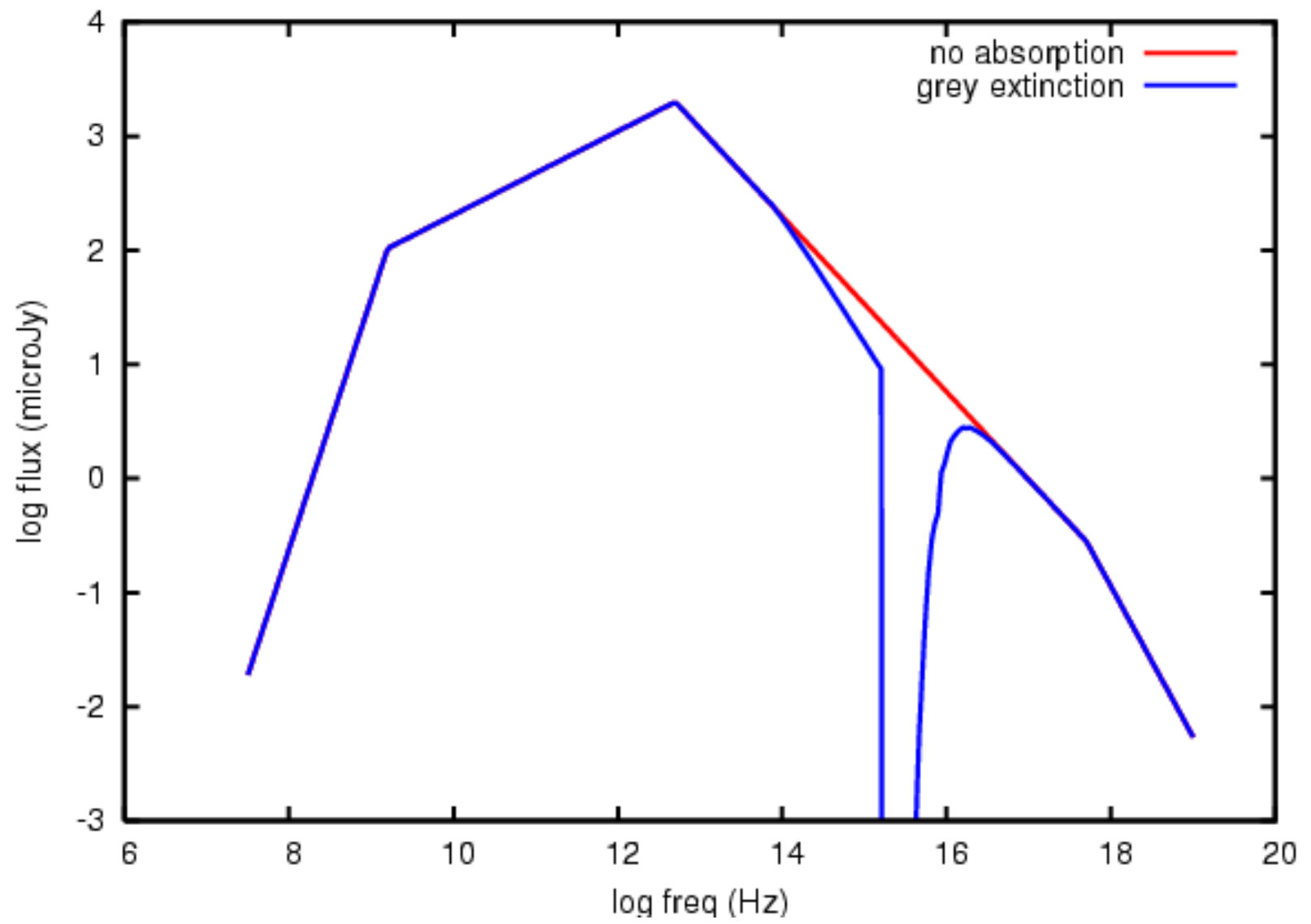


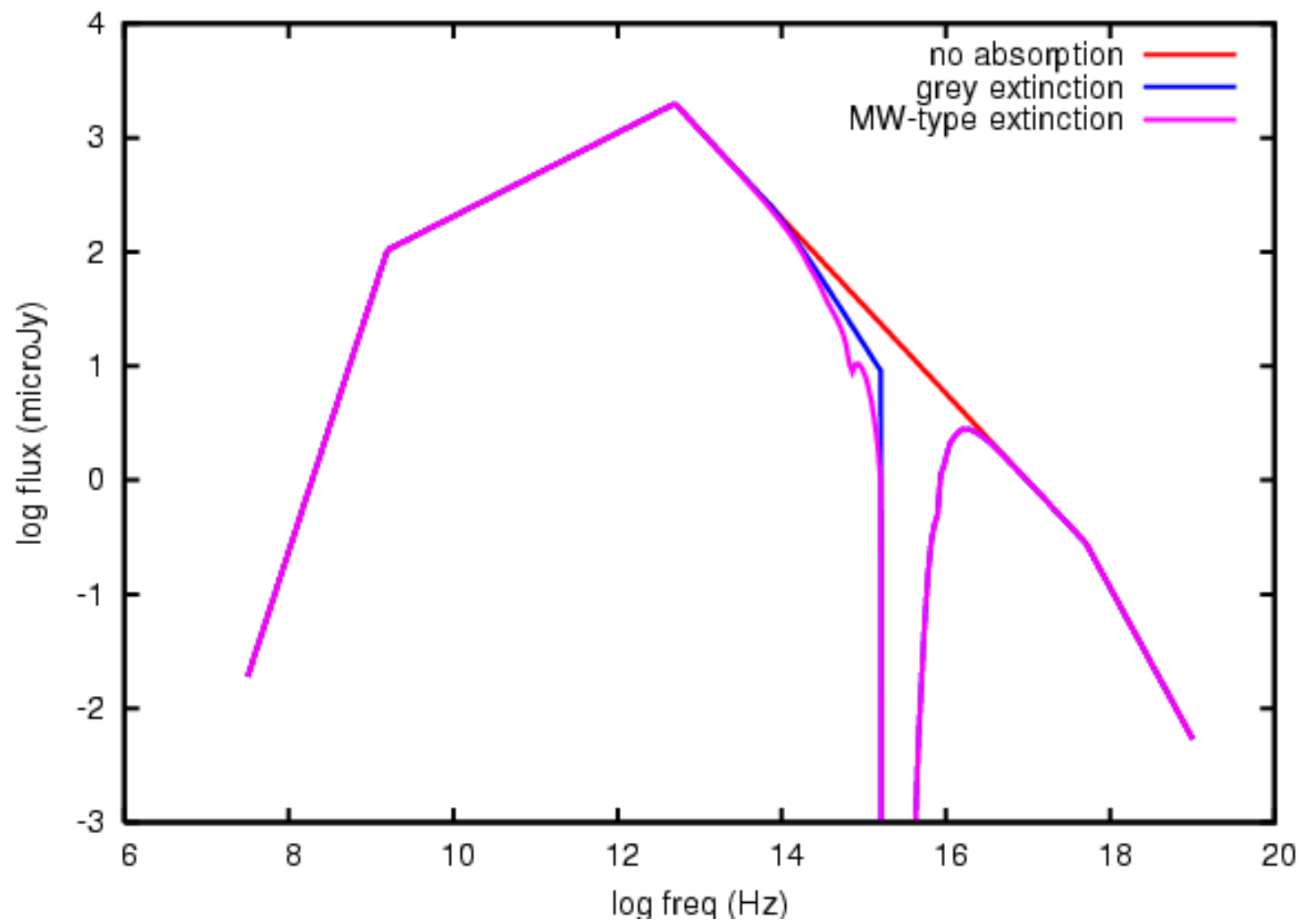
Pandey et al 2005

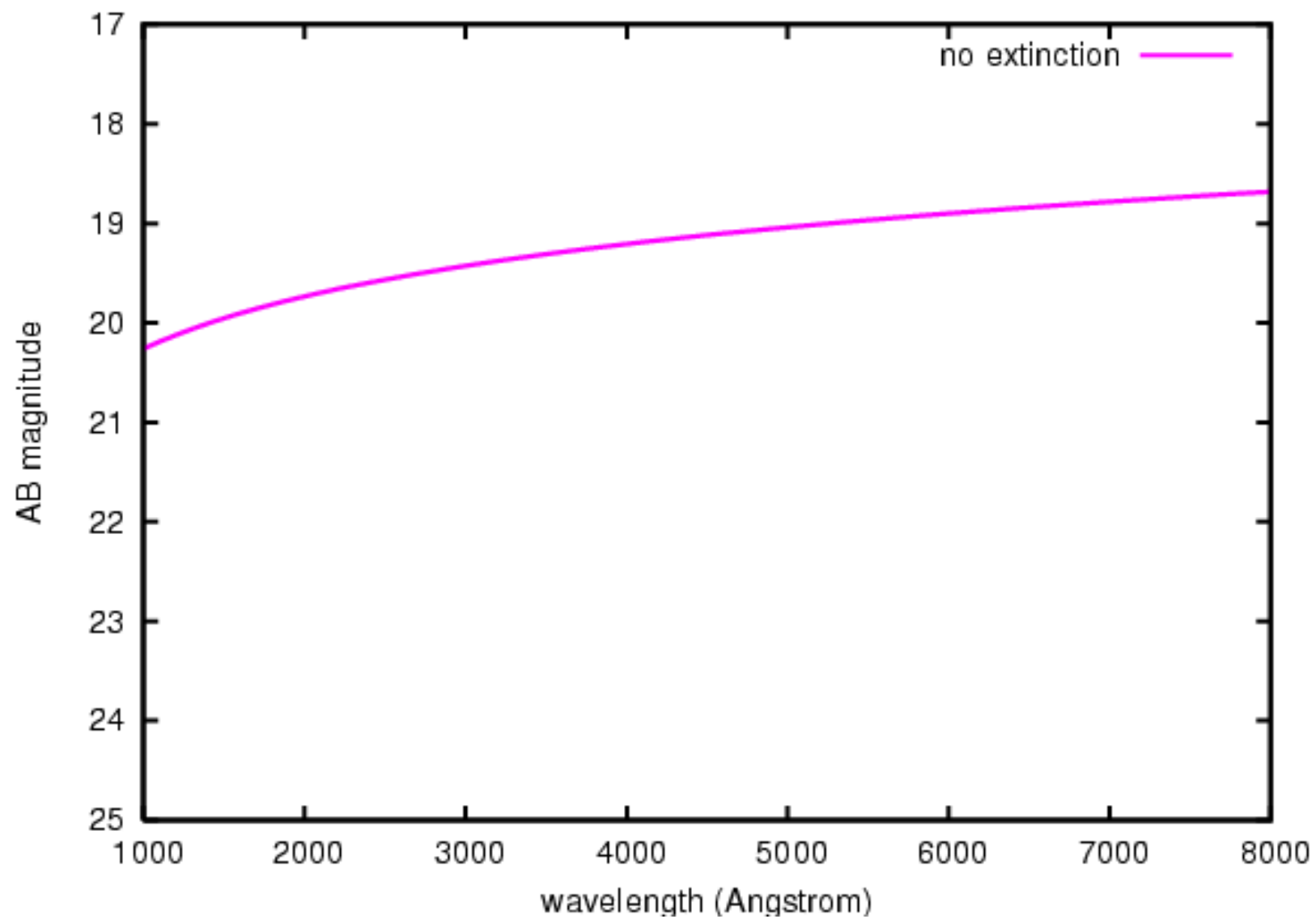
Variability in light curve

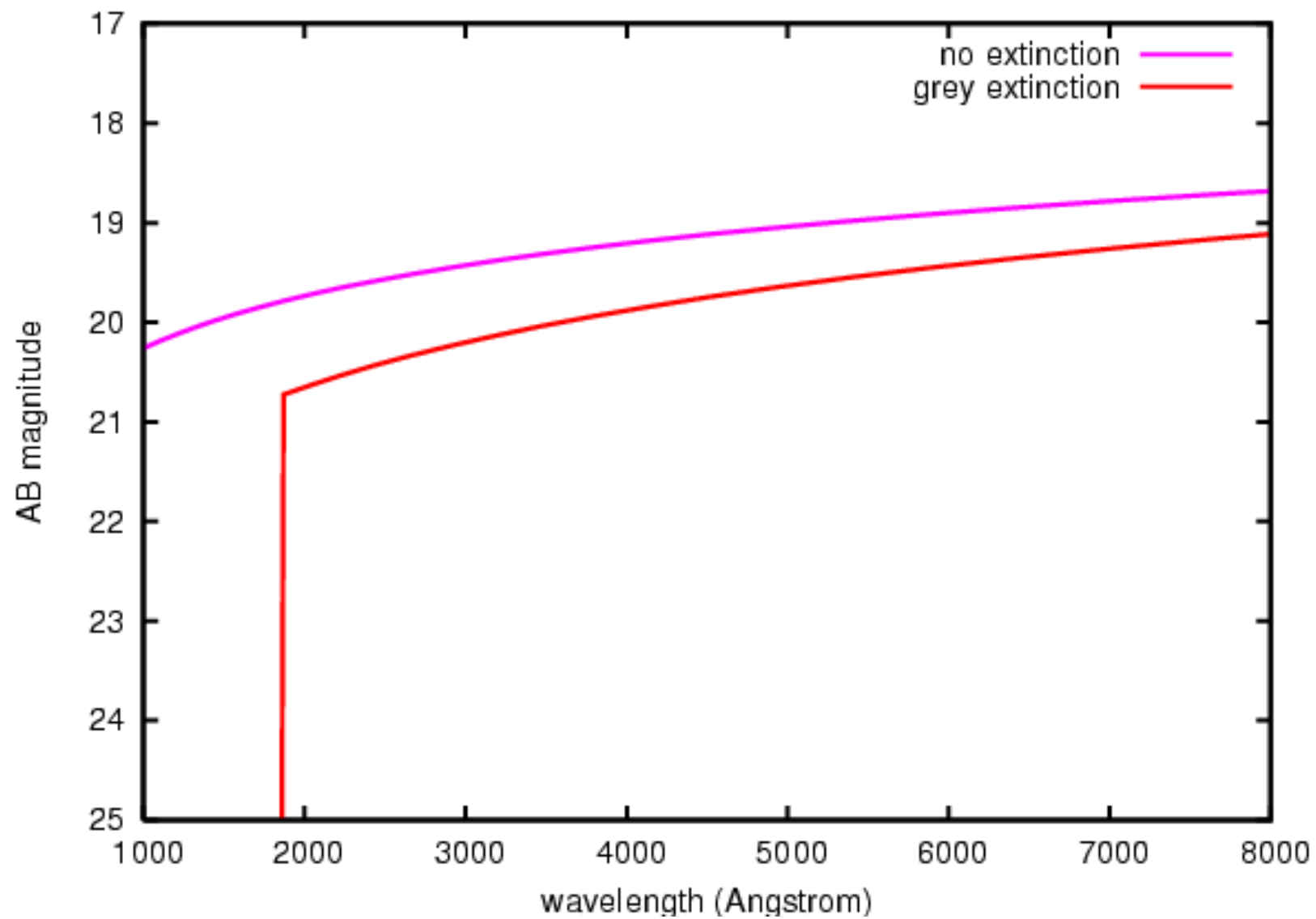
- Energy injection?
- Inhomogeneous ISM?

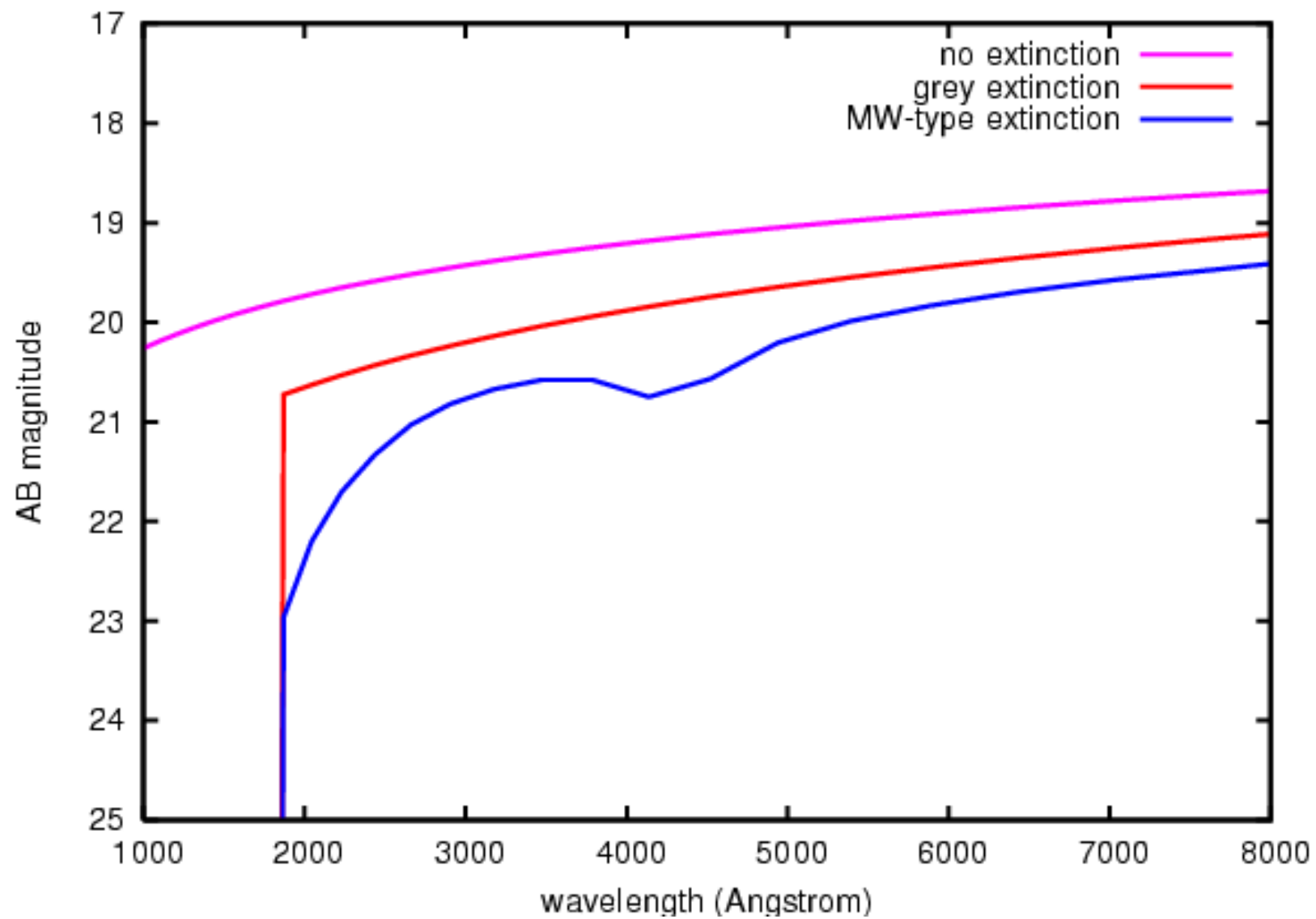


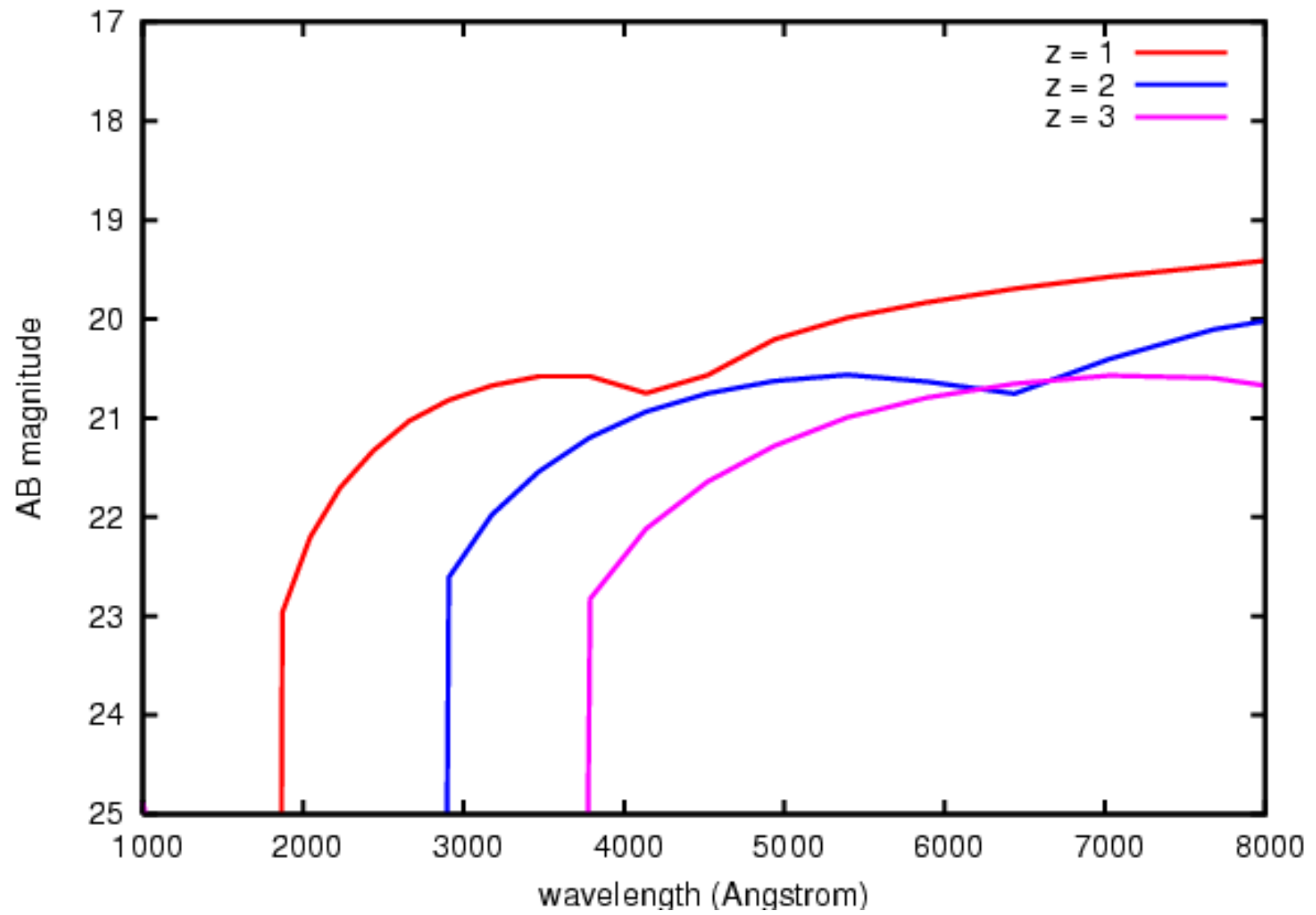




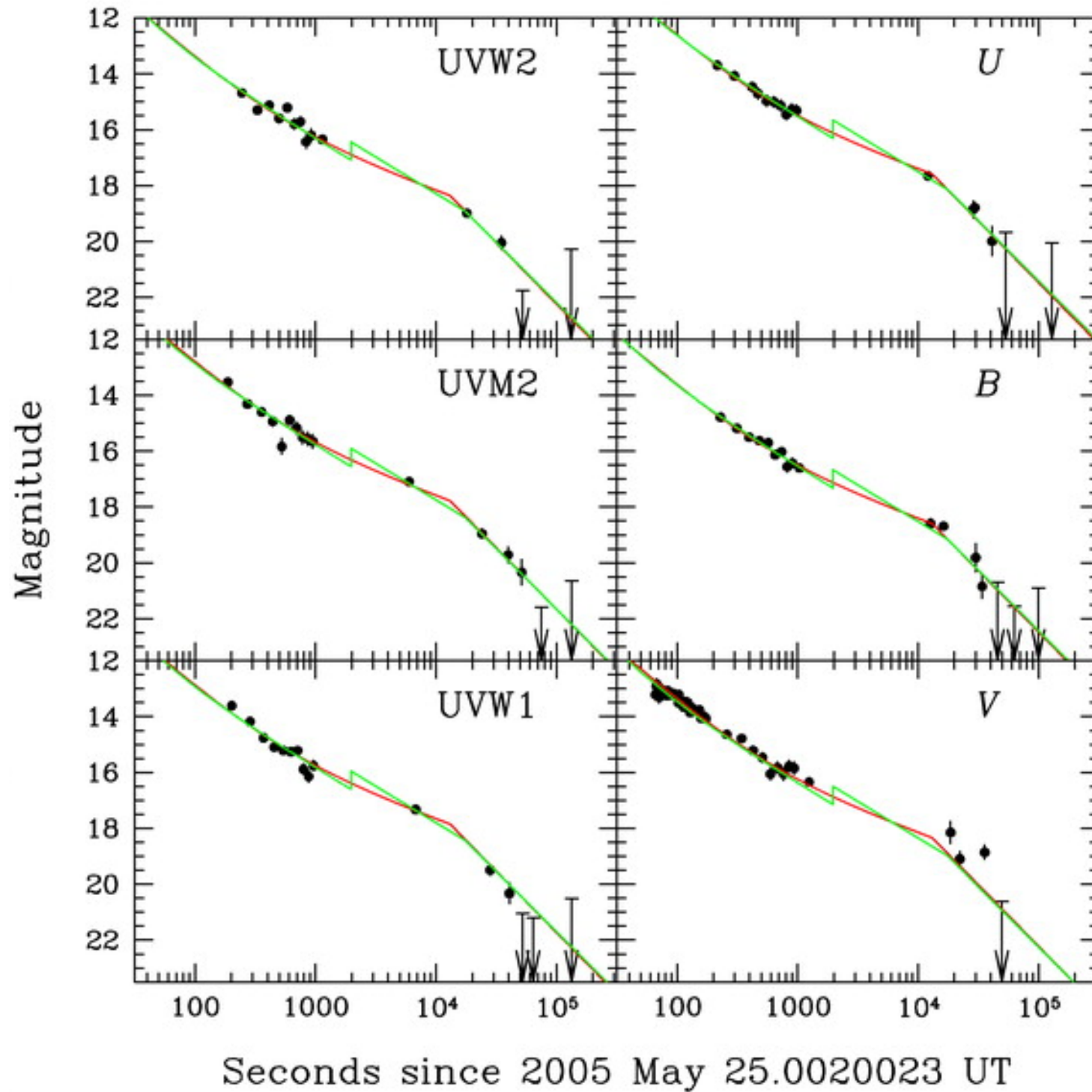




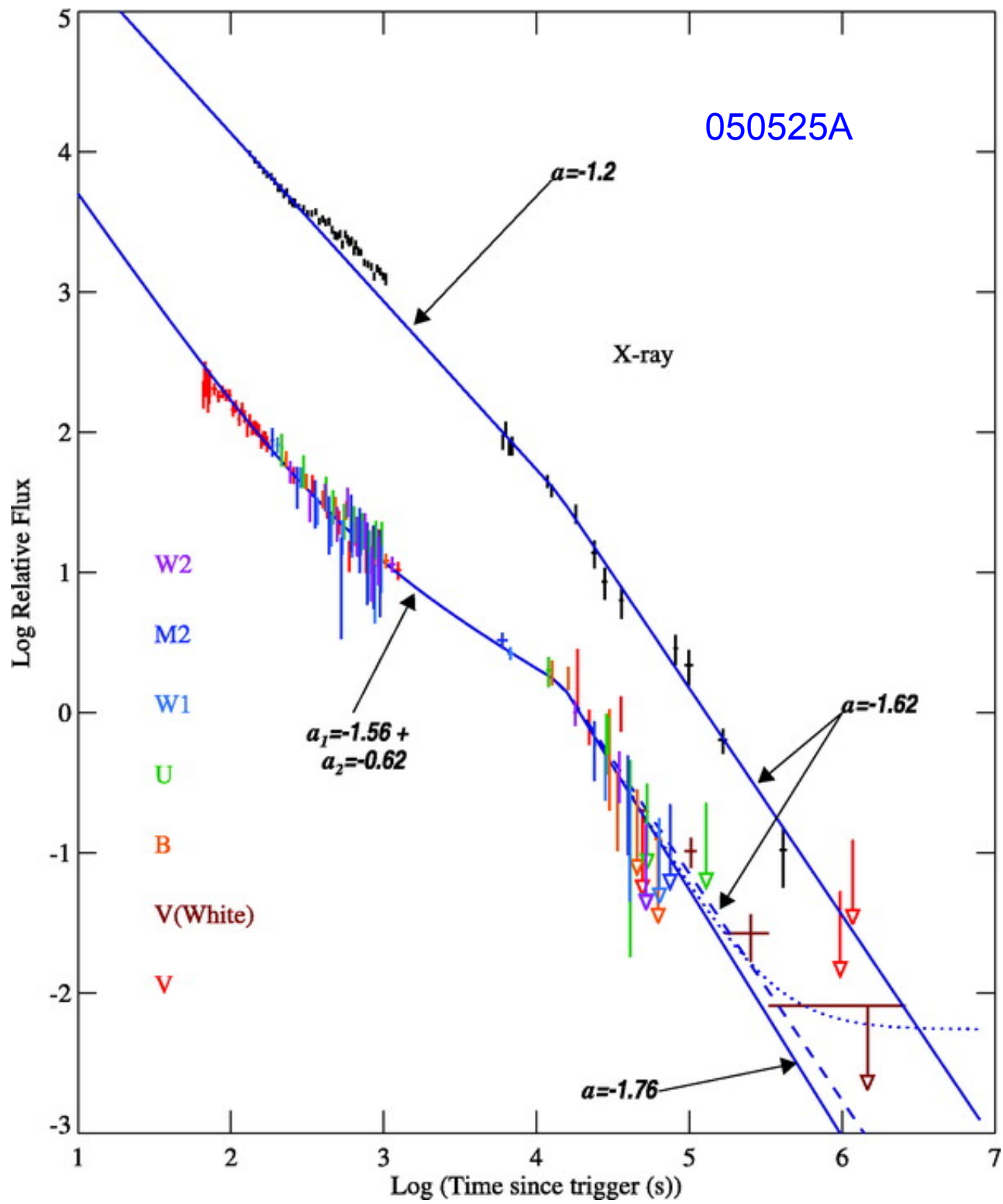




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Blustin et al 2005



ASTROSAT could possibly address the following areas :

- UV low-res spectra / broadband photometry to estimate and characterize extinction in the host
- Redshift from Lyman break
- Enlarge the sample of X-ray afterglows, study flaring behaviour
- Simultaneous X-ray, UV, optical coverage to obtain broadband spectrum, better determination of spectral shape

Study of GRBs with ASTROSAT will require quick TOO handling. In most cases observations will be possible only within a day. This will be a difficult task and hence GRB observations will not be routine.

Criteria for attempting GRB observations have to be arrived at.